Message

From: Praskins, Wayne [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=4F47BC0A2C2E42A98347D59CD1A98B19-WPRASKIN]
Sent: 5/6/2020 8:29:46 PM
To: Stralka, Daniel [Stralka.Daniel@epa.gov]
Subject: RE: HPNS: Ingestion exposure assumptions

Thanks.

Wayne Praskins | Superfund Project Manager
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From: Stralka, Daniel <Stralka.Daniel@epa.gov>
Sent: Wednesday, May 6, 2020 1:28 PM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>
Subject: RE: HPNS: Ingestion exposure assumptions

Yes, I am now. What snake pit. I'll get you responses this week.

From: Praskins, Wayne <Praskins.Wayne@epa.gov>
Sent: Wednesday, May 6, 2020 1:14 PM
To: Stralka, Daniel <Stralka.Daniel@epa.gov>
Subject: RE: HPNS: Ingestion exposure assumptions

Dan – Can you look into this further this week?

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From: Praskins, Wayne
Sent: Monday, May 4, 2020 1:12 PM
To: Stralka, Daniel <Stralka.Daniel@epa.gov>
Subject: RE: HPNS: Ingestion exposure assumptions

Dan –

Thanks. I see your initial conclusion that the Navy hasn't justified their proposed changes. I need to respond to the Navy and tell then whether we can support their proposed changes or not. If there is more you can do to respond more definitively, that would be great.

In response to your question about the fraction of the hand represented by the fingers, there is the 5% value mentioned in the paragraph I found in the BPRG Users Guide (highlighted below). The 5% is the percentage for three fingers (in a child?). The EPA 2011 reference is the Exposure Factors Handbook.

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From: Stralka, Daniel <Stralka.Daniel@epa.gov>
Sent: Friday, May 1, 2020 4:48 PM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>
Subject: RE: HPNS: Ingestion exposure assumptions

While there is very little definitive results out there, there is a lot of clutter. The Navy is cherry picking. The hand-to-mouth frequency they are proposing comes from a probabilistic modeling effort published by Wilson, et al in 2013 that used 1 event/hr as a geometric mean and a log normal distribution. The same authors did a subsequent study on sediment and used 3 events/hr using the same methods. Here is a lot of uncertainty in all tis deterministic evaluation but I don't believe that the proposed change is supported. I need to go back to the World Trade Center evaluation to see how they determined their frequency. We could have them include the 1.64 and 3 as bounding but that may open the door to doing probabilistic evaluation on the whole thing. The values that the BPRG used were from Chapter 4, 2011 EFH non-dietary ingestion factors which was not updated and should still be the referenced source.

On the fingertip surface area, the conceptual model is hand-to-mouth transfer and putting the fingers into the mouth. I don't support that the Sahmal paper is more accurate. What is the fractional surface area of the hand that is used to represent the finger in the BPRG? Wilson used 4 %, that seems rather low. I need to dig into the BPRG.

Bottom lie I don't see that they have support for the proposed changes. I would need to spend more time to definitively comment but what do you want to do?

From: Praskins, Wayne <Praskins.Wayne@epa.gov>
Sent: Friday, May 1, 2020 10:52 AM
To: Stralka, Daniel <Stralka.Daniel@epa.gov>
Subject: FW: HPNS: Ingestion exposure assumptions

Dan –

Will you have time to look into this today?

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From: Praskins, Wayne
Sent: Monday, April 27, 2020 11:11 AM
To: Stralka, Daniel <Stralka.Daniel@epa.gov>
Subject: HPNS: Ingestion exposure assumptions

Dan –

As we discussed, we have been working with the Stuart and the Army Corps to evaluate the Hunters Point remediation goals (RGs) for radiological contaminants in buildings. The RGs were adopted back in 2006 and have been incorporated into multiple RODs at the site.

The Navy evaluated the RGs by running the numbers through EPA's Building PRG calculator (BPRG) and DOE's RESRAD BUILD calculator. The risks associated with the RGs are much higher using BPRG compared to RESRAD. As an example, for radium-226, the RG is 100 dpm/100cm2. The estimated risk is two orders of magnitude higher using BPRG compared to RESRAD BUILD (2.9 x 10-4 vs. 3 x 10-6).

The BPRG calculates ingestion dose as the product of four factors: (surface concentration) x (hand-to-mouth frequency) x (fingertip surface area) x (saliva extraction factor)

The Navy has proposed changing some of the default inputs into the BPRG, including the following:

BPRG Input	**BPRG default**	**Navy proposed change**	**Navy rationale for proposed change**
Hand to mouth frequency	3 hr^{-1} (adult)	1.64 hr^{-1} (adult) (No change proposed for child.)	*"Average for Age 7-26 from EPA 2000 page D-4). The BPRG default values for FQ (17 events/hr child and 3 events/hr adult) are based on the 2011 Exposure Factors Handbook Table 4-1. However, there is no data for adults older than 11 years and the BPRG default values are based on those for 6-11 years. The 2017 update to Chapter 5 of the EFH uses 1 event/hr for adults (Pages 5-37, 5-65). From the 2003 World Trade Center report page D-5, the time-weighted average for adults age 7-26 is a minimum of 1.35/hr, maximum of 1.92/hr and an average of 1.64/hr."*
Fingertip surface area	49 cm^2 (adult) 16 cm^2 (child)	11.5 cm^2 (adult) 3.7 cm^2 (child)	*"Area of three fingertips from Sahmel et al.,2014 rather than full area of three fingers). The EPA default for saliva extraction factor is 50% based on pesticide studies in 1994. A 2014 study (Sahmel et al.) of transfer of lead to three fingers found the factor is 24% and is more applicable to the Navy contaminants. The authors note similar in 3rd para of their introduction. See https://academic.oup.com/annweh/article/59/2/210/2740608. In the same paper, they measure the area of three fingertips. The BPRG assumes that dust is transferred from an area equivalent to three fingers, not just the tips. The paper is more accurate and their value of 11.5 cm2 for the area of three adult fingertips is used. The EPA hand areas for adults (980 cm2) and children (317 cm2) are used to get the area of three child fingertips, or 11.5*317/980 = 3.7 cm2."* (Although they comment on the saliva extraction factor, the Navy is not, as far as I can tell, proposing to reduce the default value of 50%)

The BPRG Users Guide says the following about the sources of the default values:

- **Frequency of Hand to Mouth (FQ)**

The exposure factors handbook (EPA 2011, Table 4-1) and the World Trade Center report (EPA 2003) provide hand to mouth contact rates for many age groups. For the child FQ, all age groups for mean indoor contact from birth to 6 years old were time-weight averaged from the exposure factor handbook. Missing data points were substituted with data from the nearest age group. The FQ for children was determined to be 17 times/hr.
For the adult FQ, all age groups for mean indoor contact from 6 to 26 years old were time-weight averaged from the exposure factor handbook and World Trade Center report. The FQ for adults was determined to be 3 times/hr.

- **Surface Area (SA)**

In general, this is the skin area contacted during the mouthing event. The OPP recommended default was based on the surface area of the 3 fingers that a child will most likely use for hand to mouth transfer. It was assumed that 3 fingers of one hand represents about 5% of the total area of both hands (EPA 2003). The exposure factor handbook (EPA 2011, Table 7.2) presents hand surface areas for adults and children. For children, the surface areas were time-weight averaged across all age groups from birth to 6 years (317 cm), and the 5% assumption was applied to derive the child hand surface area of 16 cm .

The hand surface area for the adult was also derived from data presented in the exposure factor handbook (EPA 2011, Table 7.2). The exposure factor handbook presents hand surface areas for adult males and females of 1070 and 890 cm , respectively. These numbers were averaged to 980 cm , and the 5% assumption was applied to derive the adult hand surface area of 49 cm .

Can you evaluate and let me know if you think there is a valid basis for the Navy's proposed changes (or other changes from the default values)?

That would be great if you could get to it this week (by 5/1/20). Thanks.

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